

**Massively Multiplayer Games:**  
A Social Cognitive Theory of MMO Attendance

By

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## **Abstract**

Recent research explaining MMO usage is largely centered on empirically derived motivations and factors. The present research integrates these developments into a theory of media attendance within the framework of Bandura's (1986) Social Cognitive Theory. Respondents from player guilds were recruited through web boards to complete an on-line questionnaire. Structural equation modeling techniques will be used to test a new model of media attendance in which active consideration of previous empirical studies, moderated by MMO self-efficacy, joins habitual behavior and deficient self-regulation as determinants of media behavior.

## Introduction

“World of Warcraft” is a video game juggernaut. Within four months, 1.5 million people had signed up to battle monsters and search for treasure in the fantasy world of Azaroth. (Blizzard Entertainment, 2005). World of Warcraft is not alone in its success. “Lineage”, a game popular in Korea, has two separate versions boast that 4 million combined members (Woodcock, B. S., 2005).

What attracts people to these massively multiplayer online (MMO) games? Academics want to understand effects of playing these games, especially the whether these games are addictive. Video game developers want to understand player motivations to make better MMO games. Empirically derived motivations from previous studies will be framed in Social Cognitive terms. These motivations will then be tested against player behavior and intentions.

Bartle (1990, 1996) was the first researcher to attempt to study MMO player motivations. He began his work during the eighties studying MUDs (“multi-user dungeons”), ancestors of modern MMOs games such as “World of Warcraft”, “Everquest”, and “Lineage”. Bartle content analyzed MUD web board postings and found people had four principle playing motivations: achievement, exploration,

socialization, and domination of others. Yee (2005) extended Bartle’s work to modern MMO revised Bartle’s motivations. Yee found three principle motivations are achievement, socializing, and immersion, and many sub-motivations.

However, Bartle and Yee’s work are limited by empirical nature. Yee (2005) found significant, but weak relationships, between motivation factors and playing time. By using an established theory of usage, a better model of player motivation can be constructed. Compared to other media theories, such as Uses and Gratifications, Action theory, and Gratifications Sought/Gratifications Obtained, Social Cognitive Theory has been suggested as a superior theory to explain media usage (c.f. LaRose, R. & Eastin, M.S., 2004).

Social Cognitive Theory is based on a reciprocal dynamic between personal factors, behavior and environment. For example, I play “World of Warcraft” after coming home from a long day at work. My game playing is explained by a) I enjoy games similar to “Warcraft” (personal factors), b) I can play “Warcraft” at home and nowhere else (environment) and c) playing “Warcraft” relaxes me (behavior). How do I know that “Warcraft” will relax me? I learned from talking to my other friends first and then

experiencing the game myself. In Social Cognitive Theory, vicarious and direct learning experiences feed back into the player and build expectations. Because I have learned that “Warcraft” is relaxing, I am more likely to use it for relaxation in the future (see Bandura, 1986, 1991)

Personal factors have been refined to explain media usage (LaRose, R. & Eastin, M.S. 2004) and provide a good framework to understand MMO playing behavior. Personal factors have three major components: motivations, self-regulation, and self-efficacy. In evaluating the empirical models of player motivation, this study focuses mostly on social cognitive motivations: social, monetary, status, novelty, enjoyment, and self-reactive incentives. The first four motivations are self-obvious. However, enjoyment and self-reactive incentives require further explanation.

The media user has a set of theoretically derived motivations: social, monetary, status, novelty, enjoyment, and self-reactive incentives (Bandura, 1986, pp. 232-240). These motivations parallel most of the empirically derived motivations by Sherry, Bartle, and others (Sherry et. al, in press; Bartle 1990, 1996; Klug and Schell, in press). Of these motivations, “self-reactive incentives” requires further explanation.

Self-reactive incentives are best understood in the context of self-regulation. Under SCT, media users do not always behave as they would like. A player may evaluate an action and, based on internal or external factors, determine that it is unacceptable. The player self regulates their behavior. For example, one might be tempted to pick on a more inexperienced player in “Warcraft” today. Although this might be fun for some people, social standards may regulate this behavior. Within SCT, self-regulation has three parts: self-monitoring, judgment process, and self-reactive (Bandura, 1991). Self-monitoring is an awareness of one’s behavior and its effects on one’s self, others and the environment. The judgment process evaluates these observations against personal and social standards. One could view the practice of “player killing” as the satisfaction of the status motivations and a deficiency of the social aspect of the judgment self-regulation. Finally, self-reactive incentives are self-administered psychological awards for meeting these standards. Under this model, I am aware that I want to play “Warcraft” and that I have a paper due (self-monitoring). My personal standards include getting good grades. Although I’d enjoy playing “Warcraft”, I feel better knowing that I’ve worked on my paper so that I can get a good grade (self-reactive incentive).

Habit and addiction can be understood as a suppression of self-regulation. (LaRose, R., Lin, C. A., & Eastin, M.S., 2003).

Self-efficacy is the belief that one can successfully complete an action (Bandura, 1997). A game's self-efficacy can be understood in two ways. One, the player's perceived ability to actually play an MMO. Is the interface confusing? Are the controls difficult to use? Two, the player perceived ability to accomplish tasks within the game. Is it too hard to beat complete a quest? Are the monsters too hard to defeat? In either case, one would expect that a player with a low efficacy is less likely to continue playing the game.

Bartle and Yee's motivations can be understood in Social Cognitive motivations. Achievement is a combination of status and monetary outcomes. The empirical social motivation matches the social cognitive version exactly. Yee's immersion motivation includes Bartle's exploration motivation. Both can be understood as novelty and self-reactive motivations. Finally, Bartle's domination factor can be redefined as a combination of status and social incentives.

Armed with our understanding of Social Cognitive Theory and having redefined empirically

derived motivations in social cognitive terms, these motivations can be tested against player behavior.

### **Research Questions**

*RQ1: What game aspects and motivations are related to current MMO play time?*

What game play aspects and motivations are most strongly related to current and future game play time? Game developers in particular are interested game player motivations in order to create better games.

*RQ2: What is the relationship between game play time and depression?*

*RQ2: What is the relationship between game play time and deficient self-regulation?*

Effects researchers are interested in the addictive effect of video games in general, and MMO games in particular. Other research

### **Methods**

#### *Procedure*

MMO games are essentially large online communities linked by a shared gaming experience. Many MMO game players are involved in community web sites outside of the MMO. Prior work (Bartle 1990, 1996; Yee 2005) has used online community web sites for creating samples and found them suitable for creating a

diverse sample of game players. For our study, we decided to use community web sites for our sample.

Using community web sites has two important limitations. One, not all MMO players join MMO web boards. In particular, the sample will include more extroverted players who are likely to be more interested in interacting with their fellow players. Also, hard core players who are more likely to read community web sites. Thus, casual players are likely to be under-represented in our sample. Two, response to the web board posting is voluntary. People who choose to answer our survey may have different game playing motivations. However, we believe that the community sites are essentially diverse enough and the self-selection bias will be low.

Our survey contained 20 variables to study. For our statistical analysis, this requires a sample of 200 subjects. With an estimated 10% response rate, our initial sample was about 2000 individuals.

Google was used to create a list of MMO-related web boards. Also, a list of community web sites run by the game developers themselves was assembled by visiting various MMO corporate web sites. In both cases, the web site moderators were asked for permission to post our survey to their

web site. Many web boards listed how many members belong to that web board. Soliciting web boards continued until the sample was 2000. Web sites that did not list member numbers were solicited, but not included in our sample size. After receiving permission, the web board moderator was asked to post a link to the survey. In some cases, the moderator asked that we post the message instead and we complied.

After the two weeks, our response rate was considerably worse than expected (1 - 2%). More web boards were added to compensate for the lackluster response. The response rate may have been low because the web site member counts do not represent the number of people who actually visit the web site regularly. One set of web boards include average visitors per day. The number of visitors to member numbers varies quite widely. Thus, a web site may have 10,000 members, but only 280 visitors a week. Instead of 100 (10% of 10,000) responses, only 28 (10% of 280) would respond per week. Additional web boards were added until a the final sample of 336 valid responses was achieved.

#### *Instrument*

The survey began by asking participants to share which MMO game is their favorite. Different games are expected to attract people with

different motivations. Participants were then asked a series of questions related to their online playtime which will be used to measure overall game play behavior.

Following the procedure for understanding Social Cognitive motivations of media (c.f. LaRose, R., & Eastin, M.S., 2004), motivational items were based on prior empirical research (Bartle 1990, 1996; Yee 2005) and rephrased as outcome expectations (i.e., “While playing my favorite MMO game, I am likely to... ..” on a scale of one to seven, where one was strongly agree and seven strong disagree, cf. Ajzen, 1985). These statements of outcome expectations were classified into Social Cognitive incentive categories by consulting the conceptual definitions found in Bandura (1986, pp. 233). Six categories of expected outcomes, one representing each incentive category, were subjected to confirmatory factor analysis. In addition to motivations, deficient self-regulation and depression measures were included.

#### *Analysis*

Pearson product-moment correlation coefficients and exploratory factor analyses will be calculated using SPSS version 13.0

### **Preliminary Results**

336 valid responses from various guild web boards have been collected. Although the data analysis is ongoing, some interesting trends related to demographics have emerged. The amount of time played is the dependant variable that measures the overall enjoyment of the game. From the data, “usage” was defined as the sum of log10 transform of time played during the week, over the weekend, and in a typical game session. From the data, one can see that both age and gender are significant control factors in player motivation, deficient self-regulation, and depression.

#### Age

Dividing the sample in quartiles based on their age produced some interesting insights. In table 1, the mean score for each factor is listed, as well as that factor’s correlation with usage. No significant difference was observed in usage between the different groups ( $F = 0.842$ ). However, the different groups had significant differences in the independent factors. For example, the youngest players scored higher with status, novelty, monetary, and self-efficacy. The older players had higher levels of self-reactive incentives. Also, the younger players had significantly higher scores of deficient self regulation.

The age groups had no significant differences in depression, enjoyment, or social motives.

The youngest age group had no significant factors related with usage. However, the older groups had some weak relationships with usage

(quartile #3), monetary (quartile #2), social (quartile #3), and self-reactive (all quartiles except the first). In addition, it is worth noting that quartiles #2 and #3 had significant relationships with depression.

		Quartile 1 18-26 yrs	Quartile 2 27 – 31 yrs	Quartile 3 31 – 36 yrs	Quartile 4 37 – 60 yrs
Enjoyment	Mean	4.70	4.67	4.51	4.54
	Usage Correlation	0.147	0.186	0.233(*)	0.149
Status (***)	Mean	3.91	3.65	3.38	3.31
	Usage Correlation	0.062	0.205	0.200	-0.128
Monetary (****)	Mean	4.45	4.16	3.87	3.90
	Usage Correlation	-0.001	0.284(*)	0.166	0.149
Novelty (***)	Mean	5.51	5.32	5.26	5.47
	Usage Correlation	0.000	0.113	0.282(*)	0.118
Self Efficacy (****)	Mean	4.73	4.61	4.21	4.31
	Usage Correlation	0.067	0.047	-0.014	-0.196
Social	Mean	5.48	5.37	5.26	5.47
	Usage Correlation	0.203	0.119	0.243(*)	0.122
Self Reactive (****)	Mean	6.16	6.05	5.65	5.78
	Usage Correlation	0.106	0.321(**)	0.250(*)	0.261(*)
Deficient self-regulation (***)	Mean	3.92	3.68	3.60	3.57
	Usage Correlation	0.318(**)	0.315(**)	0.456(**)	0.243(*)
Depression	Mean	2.19	2.10	2.10	2.10
	Usage Correlation	0.172	0.263(*)	0.288(*)	-0.096

**Table1** – The mean scores of motivations and deficient self-regulation based on age. Correlations are based on relationship with usage.

- \* Correlation is significant at the 0.05 level (2-tailed).
- \*\* Correlation is significant at the 0.01 level (2-tailed).
- \*\*\* Difference between the means is significant at the 0.05 level (2-tailed)
- \*\*\*\* Difference between the means is significant at the 0.01 level (2-tailed)

## Gender

Breaking down the data according to gender also yielded interesting insights. Although there is no significant difference between overall usage ( $F=0.849$ ), the factors that

contribute to usage vary considerably. For example, the only significant factor motivation for men is social ( $R = 0.141$ ) and self-reactive incentives ( $R = 0.282$ ). However, women had significant relationships between usage and the



following: enjoyment ( $R = 0.369$ ), status ( $R = 0.259$ ), Monetary ( $R = 0.287$ ), and social ( $R = 0.301$ ) motivations.

Overall men reported higher motivational scores for status, monetary, self-efficacy, and deficient self-regulation.

The difference between deficient self-regulation was particularly striking. Although both

men and women had a significant, positive relationship between usage and deficient self-regulation, the correlation for men ( $R = 0.545$ ) was significantly stronger than that for women ( $R = 0.282$ ).

For depression, there was no significant difference between men and women. However, depression was significantly related to usage for women ( $R = 0.202$ ).

		Female	Male
Enjoyment	Mean	4.53	4.63
	Usage Correlation	0.369(**)	0.124
Status (****)	Mean	3.17	3.71
	Usage Correlation	0.259(*)	0.070
Monetary (****)	Mean	3.71	4.24
	Usage Correlation	0.287(*)	0.095
Novelty	Mean	5.27	5.32
	Usage Correlation	0.184	0.119
Self-Efficacy (****)	Mean	4.02	4.62
	Usage Correlation	0.097	0.006
Social	Mean	5.37	5.41
	Usage Correlation	0.301(**)	0.141(*)
Self Reactive Incentives	Mean	5.84	5.95
	Usage Correlation	0.252(*)	0.236(**)
Deficient self-regulation (***)	Mean	3.41	3.79
	Usage Correlation	0.545(**)	0.282(**)
Depression	Mean	2.09	2.13
	Usage Correlation	0.078	0.202(**)

**Table 2** – The mean scores of motivations and deficient self-regulation based on gender. Correlations are based on relationship with usage.

- \* Correlation is significant at the 0.05 level (2-tailed).
- \*\* Correlation is significant at the 0.01 level (2-tailed).
- \*\*\* Difference between the means is significant at the 0.05 level (2-tailed)
- \*\*\*\* Difference between the means is significant at the 0.01 level (2-tailed)

## Discussion

Analysis of this data is ongoing. Of particular interest are potential curvilinear relationships between the factors and usage. For

example, scatter plots comparing self-efficacy and usage suggest that users with low and high self-efficacy have lower usage than players with moderate levels of self-efficacy. In addition,

factor analysis may uncover relationships between specific survey items which may provide additional insight to the research questions. Finally, a deeper analysis in the age/gender relationship will be explored. The eventual goal of this analysis is a structural equation of the relationships illustrates the relationship between the different variables.

Game developers can use this information to produce games that are more tailored to a specific demographic. For example, females demonstrate have a strong relationship between usage and the enjoyment motivations. However, the mean male score for enjoyment is higher than that for females. If a game developer wants more females to play their MMO, then the developer needs to address this enjoyment gap in the experience.

For researchers interested in the effects of MMO games, this data is also useful. Young males who play MMO games exhibit stronger deficient self-regulation. Why is this? Does this lead to pathological addiction for this group? Are MMO games a coping mechanism for young men who are struggling with other problems? Why are women on score lower on deficient self-regulation but exhibit a higher correlation with usage than their male counter-parts?

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